Sustainable Careers for Researcher Empowerment

WP1

STATE-OF-THE-ART on Research Careers

Deliverable 1.2:

STATE-OF-THE-ART on Tenure Track-Like Models

SECURE
Sustainable Careers for Researcher Empowerment

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1 Introduction

SECURE Work Package (WP) 1 - State of the Art on Research Careers - focused on working conditions for researchers in Europe through two literature reviews. The first reviewed Research Career Frameworks (Task 1.1), while a second complementary review analysed tenure track-like models (Task 2.1).

This WP kicked off the SECURE project, with a view not only to landscaping content, but also to providing direct input to:

- WP2 – Development of Research Career Framework
- WP3 – Development of Tenure Track-Like Models (TTL)
- WP4 – Implementation of the Research Career Framework

Within WP1, Task 1.2 ran a State of the Art on existing literature and best and good practices on tenure track-like models focusing on funding schemes, recruitment and employment conditions and career development and assessment. It identified a range of good practice examples, taking into account institutional, regional and national initiatives by research-performing and research-funding organisations. It also considered the legal, financial and administrative implementation of tenure track-like models.

Deliverable 1.2 - Initial State of the Art on Tenure Track-Like Models - will present the results of this landscaping to provide an initial structured input to the project's overall objective to "develop a range of tenure track-like models integrating best and good practices from existing use cases".

The subsequent chapters are structured as below with Chapter 3 providing an overview and basis for WP3 and the following more focussed chapters as originally defined.

Chapter 2: Overall Methodology for Literature Review
Chapter 3: Overview of Tenure Track-like Models
Chapter 4: Review of Funding Schemes for Tenure Track-like Models
Chapter 5: Review of Recruitment and Employment Conditions for Tenure Track-like Models
Chapter 6: Review of Career Development and Assessment for Tenure Track-like Models
Chapter 7: Conclusions and Input to WPs 2, 3 and 4
Chapter 8: Annexes and Bibliography

2 Methodology for Literature Review

2.1 Vocabulary and Scope

The vocabulary around the topic is variable with different terms being preferred in different countries. The SECURE project chose to draw on the definition used by LERU - a 'fixed term contract advertised with the perspective of a tenured, i.e. permanent position at a higher level, subject to positive evaluation and without renewed advertising of and application for the next position'.[1] However, as the aim of the SECURE project is to develop a range of models that may be applicable in institutions, we deliberately used the term 'tenure track-

[1] Tenure and Tenure Track at LERU Universities – Models for Attractive Research Careers in Europe
Tenure and tenure track at LERU universities: Models for attractive research careers in Europe - LNVH

like' to collect literature, examples and practice that are of relevance. Academic tenure may be seen as a specific mechanism, safeguarding academic freedom, and this differs from permanent or open ended contracts. There is also a risk that this may be perceived as a term applicable mainly in the United States.

Two main approaches were utilised to identify relevant literature: consortium expertise, combined with desk-based research, and bibliographic analysis.

2.2 Consortium Expertise and Desk Based Research

The nature of the topic meant that it was important to draw on the depth and breadth of expertise in the consortium alongside the literature identified at proposal stage. This allowed us to identify key sources that may not appear through an academic search, such as websites, policy documents and other types of 'grey' literature.

2.3 Background to Bibliographic Analysis

Partners of the SECURE consortium performed a bibliographic analysis to identify key literature related to the concept of 'tenure track-like models' and other areas of interest to the SECURE project.

Based on experience from the sister project OPUS, SECURE partners agreed on using Scopus to conduct the bibliographic analysis.[2] Scopus is an abstract and citation database for research publications that contains over 1.8 billion cited references. The decision to use Scopus was made after a comparative test search with OpenAIRE EXPLORE,[3] an open research search portal covering a comprehensive dataset of interlinked scholarly works (publications, data, software). OpenAIRE EXPLORE was considered as an openly accessible, meaning free at the point of use, alternative to conduct the literature review.

Separate searches were conducted for search terms in the 'title', 'abstract' and 'subject' fields (instead of the 'keywords' field). These were compiled into one list and duplicates were removed. A comparison of search results is provided in **Error! Reference source not found.Error! Reference source not found.**. The results of the te st search revealed that there was little overlap between the search results, and Scopus delivered more relevant hits and was slightly more convenient to use. The number of identified sources was interestingly comparable, but the documents identified by Scopus were more relevant. To avoid using two different databases and to keep the work within the scope and available resources allocated to WP1, the task leaders decided to use Scopus as the sole database and to complement it with literature already known to the consortium. The latter is important since 'grey' literature, including policy reports or position papers, often reflects on concrete actions and implementation plans but are usually not discovered by scholarly databases such as Scopus.

[2] https://www.scopus.com/
[3] https://explore.openaire.eu

Search words	AND	SCOPUS search (Title-ABS-key) total number of hits [open access]	OpenAIRE|Explore search (Title-ABS-subject) total number of hits [open access]
research*	"career framework*"	56 [20]	55 [24]

Table 2.1 – Comparison of SCOPUS and OpenAIRE for research career framework

For consistency, partners leading tasks 1 and 2 in WP1 agreed on the same methodological approach for the State of the Art on Research Career Frameworks presented in this deliverable (D1.2) and *D1.2 Research Career Frameworks* developed in parallel for WP1.

2.4 Tenure Track-Like Models Bibliographic Analysis

The same approach was used for each of the three sub-tasks (review of funding schemes for tenure track-like models; review of recruitment and employment conditions for tenure track-like models; review of career development and assessment for tenure track-like models). Alongside sub-task specific searches, the team also ran an additional overarching search on tenure track-like models. This complemented the core analysis outlined in Chapter 3.

The approach consisted of eight steps:

1. Define purposeful search terms and relevant variations, noting the difference between word combinations vs terms.
2. Create one set of common search terms applicable to all sub-tasks and a second set of specific search terms for each of the individual sub-tasks.
3. Search Scopus combining search terms from the two sets and selecting a publication cut-off date of 2000.
4. Export search results into Excel.
5. Combine search results into a single Excel sheet and identify duplicates. Keep note of how often the article appears and delete affected rows to cut down the list.
6. Assess relevance of the article using titles (yes/maybe/no) – and further check relevance by scanning abstracts.
7. Compile final list of articles to be reviewed.
8. Complement Scopus search results with additional key literature previously identified and collected across the consortium (see section 2.2).

Steps 1 to 5 were completed by the task leader of Task 1.1 as they had access to the relevant database and applied the same methodology to both tasks. This was then shared with sub-task leaders for steps 6 to 8. Sub-tasks were assigned to sub-task leaders based on their topic expertise and their allocated person months in WP1.

The set of common search terms defined for all sub-tasks is listed below. The basis of the terms were chosen to include relevant variations of the term. For example, the search term 'research' produces results that include 'researcher' and 'researchers'.

Figure 1 – Tenure Track-Like Models Search Terms

Task-specific search terms – overarching search	Number of hits
tenure track	1592 1581 (- dupl)

Activity specific search terms (Activity 1.2.2)	**AND Common search words/combinations (for T1.2)**	**Number of hits**
Fund* OR grant*	"research* assess*" OR "research* eval*" OR "scien* assess*" OR "scien* eval*" OR "academ* assess*" OR "academ* eval*"	1777
	"research* career*" OR "scien* career*" OR "academ* career*"	1368
	"tenure track*"	257
Total		3398 3071 (- dupl)

Activity specific search terms (Activity 1.2.3)	AND Common search words/combinations (for T2.1)	Number of hits
Recruit* OR Employ* OR Condition*	"research* assess*" OR "research* eval*" OR "scien* assess*" OR "scien* eval*" OR "academ* assess*" OR "academ* eval*"	4413
	"research* career*" OR "scien* career*" OR "academ* career*"	1624
	"tenure track*"	371
Total		6308 5944 (- dupl)

Activity specific search terms (Activity 1.2.4)	AND Common search words/combinations (for T2.1)	Number of hits
"career develop*" OR "career assess*" OR "career eval*"	"research* assess*" OR "research* eval*" OR "scien* assess*" OR "scien* eval*" OR "academ* assess*" OR "academ* eval*"	30
	"research* career*" OR "scien* career*" OR "academ* career*"	547
	"tenure track*"	36

Total	613 553 (- dupl)

This set of common key search terms was combined with specific search terms for each of the individual sub-tasks as described for Step 3. Details of the specific approaches used for the sub-tasks are described in the methodology sections of the individual chapters. After compiling all Scopus search results for one sub-task and excluding any duplicates (step 5), the lists were provided to the respective sub-task leader. Each sub-task was managed by a specific partner who was selected based on their area of expertise and their allocated person months for WP1. To identify relevant publications of interest for SECURE, partners filtered the initial list to articles covering the aspects of their sub-tasks following steps 6 and 7 and started their literature reviews. Moreover, each sub-task leader was invited to complement their lists with additional sources they deemed relevant, including recommendations from the consortium (step 8). This list of core literature mentioned in step 8 had been identified by the consortium partners as relevant for SECURE but was less likely to appear in Scopus searches. Articles from this list were mostly 'grey' literature, such as policy papers, reports and position statements from the European Commission or stakeholder organisations.

More details on the process and outcome of the analysis for each sub-task can be found in Chapters 4 to 6. A full overview of all articles selected to be reviewed can be found in the Annexes (Chapter 8).

Reviewers were provided with a common template in which they were asked to document the following:

- Title / Author / Year / DOI / Publisher / Publication
- Open Access (Yes/No) and Link
- Reviewer
- Article Abstract
- Summary of relevance for SECURE on tenure track-like models
- Relevant information for A1.2.2 Funding schemes for tenure track-like models
- Relevant information for A1.2.3 Recruitment and employment conditions for tenure track-like models
- Relevant information for A1.2.4 Career development and assessment for tenure track-like models
- Any other relevant information on research career frameworks
- Relevant examples of best or good practice
- Any other references that should be reviewed.

Completed review documents were uploaded onto the shared repository. Regular meetings were held with sub-task leaders to discuss the approach, emerging findings and provide support.

SECURE partners acknowledge certain limitations to the literature review based on the decisions made with regards to the search, including the choice of the search tool and search terms, and the selection process of the documents. In this context, relevant documents might be missing from the study. However, along with the overall approach of choosing a widely used and renowned database and of complementing the results with sources identified by the consortium, significant effort was made to gather the most relevant literature.

3 Overview of Tenure Track-Like Models

3.1 Methodology

From the 52 identified pieces of core literature, 26 were selected for review. 14 of those not selected were not in English and therefore it was not possible to analyse them at this stage (they will be considered in WP3, however). 12 were briefly considered, though were found by the task leader not to contain enough

information to warrant a full review at this point. The intention of this chapter was to provide a basis overview to inform WP3 and the subsequent chapters, with the following chapters providing further analysis.

All those reviewed followed the defined template and individual reviews were uploaded into the shared repository. Where relevance for a specific task area was identified this then informed the relevant literature review chapter.

A full list of the sources analysed can be found in Annex 1.

3.2 Main findings on literature relating to tenure track-like models

From the review process it was possible to identify three core sources which will be critical in compiling *T2.1 Tenure Track-Like Models* and allow the project to identify a range of best and good practice examples which are comprehensive and allow for country and institutional differences. These core sources are described below:

1. Tenure and Tenure Track at LERU Universities – Models for Attractive Research Careers in Europe[4]
This important advice paper is central to the work of SECURE. First, it provides the clearest definition of tenure track that is applicable to the project. Tenure track is defined as a 'fixed term contract advertised with the perspective of a tenured, ie. Permanent position at a higher level, subject to positive evaluation and without renewed advertising of and application for the next position'. The paper then defines four academic career models in Europe and North America, followed by analysis of recent developments of career paths towards tenure track in LERU universities, European countries and North America, highlighting a number of examples. These include probation on the job and tenure at an early career stage in the UK, tenure tracks to higher career stages in Netherlands, Belgium (Flanders), Sweden and Italy, tenure tracks to higher career stages in Germany, Switzerland and Finland, the absence of tenure track models in France and Spain, developments in North America, and a summary of recent European developments which can inform the development of models and good practice examples. Finally, it makes recommendations which are in accordance with the project goals, including that 'Universities and other research institutions should provide guidance and support for beginning tenure track appointees, continue with appropriate support and mentoring along the way, and pay special and timely attention to those researchers to whom tenure may not be granted'.

2. Precarious Careers in Research[5]
This study maps employment contracts and career models with a view to understanding where and which groups of researchers suffer from the most precarious careers and remuneration packages, to develop indicators and suggest policies to reduce the precariousness of researcher careers. This is an important report for the SECURE project as it is extremely recent and relevant and makes policy recommendations on supply and demand for researchers from several perspectives, including at EU and local levels. It will be essential for the development of the Research Career Framework in WP2.

3. Federal Ministry of Education and Research – The Tenure Track Programme[6]
This website provides a starting point and overview of the Joint Federal Government-Länder Tenure-Track Programme. The programme began in 2017 and aims to fund 1.000 tenure track professorships by 2032,

[4] Tenure and Tenure Track at LERU Universities – Models for Attractive Research Careers in Europe
Tenure and tenure track at LERU universities: Models for attractive research careers in Europe - LNVH
[5] Jurgen Janger, Alexandros Charos, Peter Reschenhofer, Anna Strauss-Kollin, Fabian Unterlass, Stefan Weingartner – Precarious Careers in Research https://ideas.repec.org/b/wfo/wstudy/70473.html
[6] Federal Ministry of Education and Research – The Tenure Track Programme – website
The Tenure-Track Programme — English (tenuretrack.de)

supported by over one billion euros of funding. The intention is that this will strengthen Germany's academic system and will be supported by initiatives that drive cultural change in institutions, such as enhanced academic structures and long-term improvements in equal opportunities and work-life balance. The website contains policies and information relevant to all aspects of the SECURE project, including funding, recruitment, and career progression, although some documents may require translation from German. The website also clearly details where these systems are in operation, something that will aid the identification of best and good practice. An additional 14 documents in German were identified by our consortium as being of interest, however it was not possible in the scope of this review to look at them in detail and we wanted to ensure time was given to a balance of countries represented, but they should be considered as the models and project develops. VDI/VDE Innovation are a SECURE consortium member and provide expertise on this and translations should be fairly straightforward through Deepl as required.

The information from this website is complemented by the **2021 National Report on Junior Scholars**.[7] This report from the Consortium for the National Report on Early Career Researchers refers to various regulations to improve work-life balance, whilst the funding programmes of the German Research Foundation also have a package of measures designed to boost the compatibility of family life and an academic career. The monitoring of and career tracking of those following this process in Germany through **almenta.de**, as described in a press release,[8] provides robust analysis on the extent to which a tenure-track professorship improves the academic landscape, as well as data on career paths. This has been ongoing since 2017.

Overview of additional sources

Academic Career Structures in Europe: Perspectives from Norway, Denmark, Sweden, Finland, the Netherlands, Austria and the UK[9] offers a useful overview of the systems in the countries featured, including a table showing the status of tenure track. Additionally, **The Rocky Road to Tenure – Career Paths in Academia**[10] highlights notable differences between countries, as well as comparisons with the American system. This should be considered when identifying best and good practice but may be a little out of date.

What and how long does it take to get tenure[11] includes examples from Germany, Austria and Switzerland, with good descriptions of factors to consider in the recruitment and assessment process for tenure track. **Time to Tenure in Spanish Universities**,[12] meanwhile, considers factors, sub-factors and variables which all influence the time to achieve tenure. Guidance for career development can be found on institutional websites. For example, **the University of Antwerp career options website**[13] provides an overview of how researchers could be better supported. The **European University Institute website**[14] moreover, contains information on academic careers by country, including recruitment and career advancement, positions, salaries, access to non-nationals and gender information.

[7] The Consortium of the National Report on Early Career Researchers - https://buwin.de/dateien/2021/buwin-2021-keyresults.pdf
[8] https://www.diejungeakademie.de/en/press/dem-tenure-track-programm-auf-der-spur
[9] Academic Career Structures in Europe - https://nifu.brage.unit.no/nifu-xmlui/bitstream/handle/11250/2487666/NIFUreport2018-4.pdf?sequence=1&isAllowed=y
[10] Brechelmacher A., Park E., Ates G., Campbell D.F.J – The Rocky Road to Tenure – Career Paths in Academia
[11] What and How Long Does It Take to Get Tenure? The Case of Economics and Business Administration in Austria, Germany and Switzerland - https://doi.org/10.1111/j.1468-0475.2008.00449.x
[12] Luiz Sanz Menendez, Laura Cruz-Castro, Kennedy Alva – Time to Tenure in Spanish Universities: An Event History Analysis - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0077028
[13] SECURE_WP1_Core Documents Initial list.xlsx
[14] European University Institute – Careers by Country
Careers by country • European University Institute (eui.eu)

Translating tenure track into Swedish: tensions when implementing an academic career system[15] compares tenure-track programmes at three Swedish institutions highlighting design and development, ways of handling emerging tensions, and a discussion of key considerations when creating a tenure track. This has considerable potential to inform best and good practice models.

Three additional papers drew on examples from Finland. **Reaching for different ends through tenure track – institutional logics in university career systems**[16] contains useful information on recruitment and performance management processes. Widening the scope to four Nordic countries, **View of the Recruitment of Full Professors According to Pre-Determined Criteria in Four Nordic Countries**[17] highlights some employment and legal points to consider, including probation, promotion rights, the regulation of professor qualification criteria, employment regulations, equal opportunities and the right to appeal. The same author's paper **Tenure Track Career System as a Strategic Instrument for Academic Leaders**[18] contains some useful general observations about tenure track and leadership. It identifies two main benefits - to attract high performing junior researchers globally and to allocate resources.

Four papers highlighted some of the more negative aspects of tenure track that should be acknowledged and considered. **Incentivizing academics: experiences and expectations of the tenure track in Finland**[19] complements existing research from northern America that identifies how academics associate tenure track success with publications and research funding success (i.e. more traditional modes of research assessment). There is a risk that this creates a particular kind of academic and may restrict academic freedom and independence. There is also some evidence that this impacts negatively on some groups more than others, such as women. **Structural properties and epistemic effects of scientific careers in transition to tenured professorships**[20] observes that individuals on tenure tracks show higher satisfaction levels but also longer working hours. **Pakistan Rewarding Academics: Experiences of the Tenure Track System in Pakistan**,[21] moreover, provides interesting insights into how the environment – teaching, research standards and internal administrative processes – were not able to support the introduction of tenure track. While this might not translate directly to the European context, it serves as a reminder of the importance of institutional context.

Gender emerges as an important theme in the literature. **The Tenure Track Model: Its acceptance and perceived gendered character**,[22] a small study in Dublin, highlights the gendered dimensions of the tenure track recruitment process, with women identifying a lack of clarity around parental leave and differences in salary negotiation. It emphasises the need for a cautionary approach. **Can Mentoring Help Female Assistant**

[15] Henningson Maliln, Jornesten Aners, Geschwind Lars – Translating tenure track into Swedish: tensions when implementing an academic career system

[16] Maria Pietilä1 & Romulo Pinheiro -Reaching for different ends through tenure track – institutional logics in university career systems https://link.springer.com/article/10.1007/s10734-020-00606-2#citeas

[17] Petri Mantysaari – View of the Recruitment of Full Professors According to Pre-Determined Criteria in Four Nordic Countries - https://journals.ub.umu.se/index.php/njolas/article/view/242/230

[18] Maria Pietila - Tenure track career system as a strategic instrument for academic leaders: European Journal of Higher Education: Vol 5, No 4 (tandfonline.com)

[19] Maria Pietila - Incentivising academics: experiences and expectations of the tenure track in Finland - Pietil_SHE_2017.pdf (helsinki.fi)

[20] Phillippe Dittman – Structural properties and epistemic effects of scientific careers in transition to tenured professorships https://doi.org/10.5281/zenodo.6975389

[21] Tayyeb Ali Khan, Naisre Jabeen and Tom Christensen – Rewarding academics – Experiences of the tenure track system in Pakistan - https://onlinelibrary.wiley.com/doi/full/10.1111/hequ.12410

[22] Pat O'Connoer and Eileen Drew – The Tenure Track Model: Its Acceptance and Perceived Gendered Character - https://www.mdpi.com/2813-4346/2/1/5

Professors in Economics?[23] and **Peer Mentoring for Tenure Track Faculty,**[24] both northern American studies, explore the role of mentoring. In the latter study, new faculty members mentor each other to build a strong supportive cohort and create new collaborative opportunities. Additionally **Do researchers' early careers have to be precarious** an article from the UK notes the amount of talent leaving academia particularly female and black and ethnic minority researchers due to the highly competitive and precarious post-doctoral phase.[25] **The Leibniz Programme for Women Professors**[26] aims to support the recruitment of top women and promote initiatives that pave the way for such appointments at an early stage. It is aimed at women in all disciplines with an outstanding international track record and will be a useful case study. It would be interesting to further interrogate eligibility criteria and how someone is judged to be outstanding. Additionally, the **Lise Meir Excellence Programme**[27] offered by the Max Planck society is aimed at women scientists at the beginning of their scientific career and already ranking as exceptional in their research area. After a period of five years, they will be offered the opportunity to join the internal Max Planck tenure track procedure.

3.3 Main points for further analysis and suggested input for WP2, 3 and 4

WP3 should consider the different interpretations of 'tenure track' and create an overarching definition that has currency for all. This definition should also work in parallel with the research career framework developed in WP2.

The analysis of key sources identified by the SECURE consortium demonstrates variance between countries in the interpretation and implementation of tenure track-like models. Good practice examples identified in WP3 will need to draw from a variety of countries and reflect variance in legality, culture and administrative systems. The bibliographic review has identified many sources for this, but there are still gaps in terms of national coverage that will need to be addressed. This must be mapped in more detail to show coverage and guide effort in seeking good and best practice examples.

There are many examples from Germany that require further interrogation. However, we should ensure this is balanced and that we are not suggesting that one national system is preferable. Instead, emerging themes from these examples could be seen as offering key considerations when implementing tenure track and could be developed into recommendations. WP3 must consider equality, diversity and inclusion, particularly gender.

Tenure track models are usually based on a five-year period. Given the relatively short amount of time to pilot initiatives in WP4 (less than a year), we should identify smaller manageable options that are possible to test fully and that will be of benefit to the institution. This should be a collaborative process with pilot partners.

4 Review of funding schemes for tenure track-like models

4.1 Methodology

Starting with an initial 3071 papers to screen, we decided to narrow the scope by using additional keywords from the paper titles, keywords and abstracts. The pre-defined keywords were: 'position', 'tenur*', 'permanent' and

[23] Donna K Ginther, Janet Currie, Francine D Blau and Rachel Croson - Can mentoring help female assistant professors in economics? An evaluation by randomized trial
[24] Jacelon C, Zucker, D, Staccarine, J-M, Henneman E – Peer Mentoring for Tenure Track Faculty
[25] Mellors-Bourne R - Do research careers have to be precarious? https://www.vitae.ac.uk/impact-and-evaluation/what-do-researchers-do/do-researchers-careers-have-to-be-precarious-research-article.pdf/view
[26] Leibniz Programme for Women Professors - https://www.leibniz-gemeinschaft.de/en/research/leibniz-competition/leibniz-programme-for-women-professors
[27] https://www.mpg.de/18399586/lise-meitner-gruppenleiterinnen-2021.pdf

'contract'. Using these additional keywords, we were able to identify 500 key articles. We then analysed these papers manually, using the titles and abstracts to cut down the selection to 18 sources. These papers were distributed among team members, and the summary is below.

The decisions made during the search and selection process of the documents may have resulted in limitations, with the inclusion/exclusion criteria leading to the non-consideration of relevant documents. During the review, it was found that not all the 18 documents were closely related to the topic and the findings were limited. It was therefore decided to complement the findings with a couple of key documents from the grey literature, to provide a more detailed overview (e.g. The Federal Ministry of Education and Research, Germany; Swiss National Science Foundation).

The main aim of this chapter was to examine funding schemes for tenure track-like models but the analysis by country has also allowed observations to be made on general differences in context and framework conditions for tenure track-like models.

4.2 Main findings on funding schemes for tenure track-like models

Declining core governmental funding for higher education institutions (HEIs) and increased external project funding, may lead to an increase in externally funded research positions. Projectification, a term used to describe this notion, may result in an increase in the number of PhD students and postdocs working on project-based research whereas the overall numbers of academic staff may not have increased proportionally , depending of course on the country and academic discipline.[28] The balance between core and project should be considered when looking at tenure track and the varying models that relate to it.

Organisational level (institutional) funding is defined as 'the total of national budgets in a given country, attributed to a research performing organisation (university or Public Research Organisation), with no direct selection of R&D projects or programmes and for which money the organisation has more or less freedom to define the research activities to be performed'. Institutional funding can be allocated in the form of non-competitive block funding. To a considerable extent this block funding may be earmarked for particular expenditures such as infrastructure or researchers' salaries, especially in research systems where permanent researchers are civil servants. The university may have some discretion in allocating a non-earmarked part of this block funding to further support research activities. Institutional funding can also be allocated in a variable/competitive manner. This can for example be tied to performance contracts. Another approach consists of 'centre of excellence' schemes in which research organisations or research units are allocated institutional funding on the basis of an ex-ante assessment of research potential. Alternatively, institutional funding can be tied to ex post assessments of the output and performance of universities. The relevance for tenure track is unclear but further analysis of assessment in tenure track and the relationship to funding might be of interest.

The different national funding allocation systems can be further classified according to the type of performance-based research funding (PBRF), as shown in Scheme 1.

Figure 2 Research performance funding system

[28] Channah Herschberg, Yvonne Benschop, Marieke van den Brink, Precarious postdocs: A comparative study on recruitment and selection of early-career researchers, Scandinavian Journal of Management, Volume 34, Issue 4, 2018, Pages 303-310, ISSN 0956-5221, https://doi.org/10.1016/j.scaman.2018.10.001.(https://www.sciencedirect.com/science/article/pii/S095652211830040X)

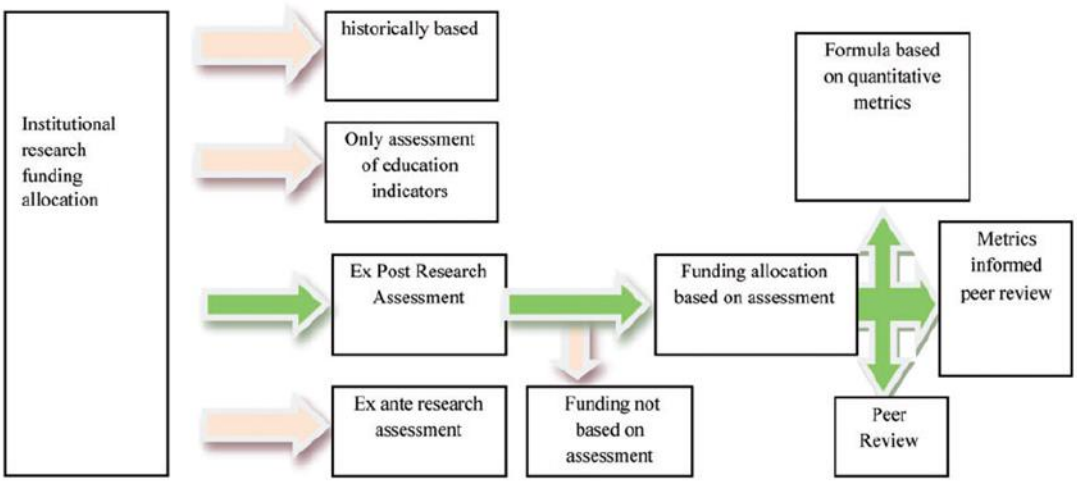

Figure 1. Research performance funding systems.

Source: (Zacharewitz et. al, 2019)

Many European countries have implemented some form of performance-based research funding, with variables such as education/training-based metrics, research outputs and publications, citation-based impact metrics, international excellence, patents, revenues from industry cooperation, external R&D funding, scientific awards, patents, financial commercialisation of research results, faculty characteristics, student enrolment and PhD defences.[29]

It should be noted that there are many differences in the research and education systems, cultures, and regulations across countries in Europe, with tenure track-life models also taking different forms. This means that a more flexible system, rather than a one-size-fits-all approach, will be needed. Summaries of examples and practices can be found below. They have tended to focus on specific circumstances for postdoc positions.

Belgium

The Flanders system uses the 'three-legged stool' funding mechanism for research and is unique in Europe, being divided into national funding, a Special Research Fund (BOF) for blue-sky research and an Industrial Research Fund (IOF) for strategic applied research, innovation, and outreach activities. The salaries of all tenured faculty are paid out of the lump sum, and at each university there are only a small number of other indefinite academic appointments that can be terminated only for a specific cause or under extraordinary circumstances. The final responsibility for providing education, managing research activities, and supervising PhD students rests on the tenured faculty. Due to governmental regulations, IOF- and BOF-funding can only be used for financing short-term research grants, PhD scholarships and postdoctoral fellowships. Flanders, like many other regions and nations, has adopted PBRFs to improve and provide public accountability for its science and innovation system. It is set up by national or regional authorities and determined by a peer review process evaluating the output and impact of research. The results of the assessment are translated into a funding formula to allocate part of the institutional

[29] Thomas Zacharewicz, Benedetto Lepori, Emanuela Reale, Koen Jonkers, Performance-based research funding in EU Member States—a comparative assessment, Science and Public Policy, Volume 46, Issue 1, February 2019, Pages 105–115, https://doi.org/10.1093/scipol/scy041

funding to the universities. Some of the weighted parameters used in the partition formula are publications, citations, EU framework programs, interdisciplinary research, diversity parameters, revenues from industrial contracts and patents. From 2006, the Belgian government earmarked some of the additional BOF-funding to provide long-term support to world-leading researchers. The idea is similar to that of the Max Planck institutions in Germany. Each university's research council must make the selection and these researchers receive a substantial amount of funding until their retirement.[30]

Switzerland

In Switzerland, most of the research-funding budgets (up to 61%) come from the private sector and approximately 80% are core funded. The Swiss National Science Foundation (SNSF), a private foundation which receives its mandate from the federal government, focuses on two main funding schemes: scientific projects and scientists' careers, and supports all disciplines, following a bottom-up principle. Its main goal is to promote a high level of science and research in Switzerland.

SNF allocated in 2015 a budget of approximately 877 million Swiss francs mostly spent on research projects and supporting scientists' careers. Research project topics can be chosen freely, and researchers should have a strong scientific record, mirrored in achievements that go beyond publications in journals with high impact factors. Ideally, the candidates have contributed remarkable accomplishments in their respective research fields. SNF Project Funding has been increased to four years, to give PhD students the opportunity to finish within the time limit of their project. Most of the career development grants cover not only the salary of the grantee but also a small research group, including project costs.

The former SNF Professorship program, replaced by SNSF Eccellenza scheme in 2018, is intended for highly qualified young researchers who aspire to a permanent professorship. Eccellenza supports them in achieving their goal as leaders of a generously funded research project with their own team at a Swiss higher education institution. Eccellenza covers the grantee's salary at local rates applicable to assistant professorships and project funds up to 1,000,000 Swiss francs for a maximum duration of five years, the minimum duration being three years. Applicants for this program must have a proven record of at least two years´ research activity at a Swiss higher education research centre, or they must be Swiss nationals or have a Swiss higher education degree. They have never held a professorship position (including assistant professor or professor in Switzerland or abroad). They must have a doctorate (PhD) or at least three years of research activity after obtaining their higher education degree. The application must be submitted up to eight years after their PhD defense or after the date of the equivalent qualification. These grants are aimed at researchers who wish to conduct a research project while holding a post that offers research independence at assistant professor level at a Swiss higher professorship. The objective of this funding scheme is the obtainment of a permanent professorship (Regulations on SNSF Eccellenza Professorial Fellowships, 2020).

Germany

As mentioned in the previous chapter, in 2016, Germany's federal states (Länder) and the Federal Ministry of Education and Research joined forces to launch the Joint Federal Government-Länder Funding Programme for Junior Academics (2017 – 2032). The goal of the programme is to provide long-term funding for junior academics at Germany's universities and equivalent higher education institutions as they work towards obtaining a lifelong professorship. This will make Germany's academic system stronger and more attractive on the global stage.

[30] Luwel, M., 2021. Performance-based Institutional Research Funding in Flanders, Belgium. Scholarly Assessment Reports, 3(1), p.3.DOI: https://doi.org/10.29024/sar.29

The Joint Federal Government-Länder Tenure-Track Programme will result in the first ever widespread introduction of tenure-track professorships at German universities and higher education institutions and will make a lifelong professorship more transparent and predictable for many academics. These academics are initially employed by the university on a temporary basis for a period of up to six years. The difference is that they immediately transition to a permanent professorship once they have successfully completed the probationary period (known as the tenure track). The only condition associated for the transition to a professorship is the successful completion of a tenure evaluation. The Federal Government-Länder Programme guarantees that those holding positions will receive appropriate initial funding for equipment and will be able to conduct independent research and teaching, even in the early stages of their academic careers. The clearly defined period for the tenure phase also means that junior academics will gain certainty about their permanent position in the academic system much earlier than has previously been the case.

The programme also has a broader focus - it aims to encourage the enhancement of human resources (HR) structures for the entire academic workforce at German universities, including career paths not associated with professorships. The programme´s resources can be used to fund both personnel costs and material expenses for a period of up to six years. The university must have made a binding decision to introduce the tenure-track professorship career path. Furthermore, it must demonstrate that one of its executive board's strategic objectives is to further the personal development of junior academics and of all academic staff. Finally, the university must present an HR development concept containing information about standards, the level of institutional commitment and it implementation status. Universities can receive funding for up to a maximum of thirteen years with the overall duration of the programme (2017 – 2032).

The requirements to apply for tenure include that the applicants for a tenure-track professorship shall have moved to a different university once they have obtained their doctorate or must have been employed for at least two years in the academic field outside the higher education institution to which they are being appointed professor.

The transition to a permanent professorship requires a successful, quality-assured evaluation according to clearly defined and transparent criteria at the time of appointment.[31] . It would be useful to explore further what metrics and data are being collected.

This is just one example of a funding scheme and others would also be of relevance and provide useful good and best practice examples for example Wissenschaftszeitgesetz.[32]

Netherlands

In a Dutch university, postdocs receive a university employment contract and therefore fall under the collective labour agreement for Dutch universities. In the Netherlands, a new law implemented in 2015 prescribes that academic staff cannot get more than three consecutive temporary contracts. The total period of temporary employment cannot exceed four years (this used to be six years). As a result, academics on temporary positions are not able to renew their contract with their employer once they reach four years of employment. Given the current financial structure of universities, this law will in all likelihood increase precarity, as universities are often

[31] Dirk-Olivier Laurent (2016), Bekanntmachung der Verwaltungsvereinbarung zwischen Bund und Ländern gemäß Artikel 91b Absatz 1 des Grundgesetzes über ein Programm zur Förderung des wissenschaftlichen Nachwuchses, Gemeinsame Wissenschaftskonferenz Buro, Available at: https://www.tenuretrack.de/de/dateien/tenure-track/verwaltungsvereinbarung-wissenschaftlicher-nachwuchs-2016.pdf (Accessed on: 13.04.2023)

[32] https://www.bmbf.de/bmbf/de/forschung/wissenschaftlicher-nachwuchs/wissenschaftszeitvertragsgesetz/wissenschaftszeitvertragsgesetz_node.html

not willing to turn fixed-term positions into permanent ones. In the Netherlands, only 20% of all postdocs secure an appointment as assistant professor.[33]

Sweden

In Sweden, early career researchers can be employed in a post-doctoral research position for a maximum of only 2 years, after which their temporary employment status can only be extended for an additional 2 years. This extension is dependent on whether there are monetary resources for this, either obtained by the early career researchers themselves or from another (often more senior) person in the department. After this time, the researcher must be either permanently hired (as decided by the organisation) or must leave the university.[34] To be permanently hired, funding must be provided for the position, either by the early career researchers themselves or by another researcher at the department. [35]

France

The main source of funding for French PhD students is the Ministry of Research (MENRT). PhD and postdoctoral training is more explicitly understood as state responsibility and is much more centralised. Doctoral education can be seen as a very specific form of on-the-job training. If a French scientist fails to enter the academic sector, where tenure does exist from the early career onwards, they will have trouble finding a job in the private sector. Consequently, a majority of doctoral researchers occupy temporary positions mostly in foreign countries waiting for better academic opportunities. The tenure track in France is known as the Open-Ended Labor Contract (OEC).[36]

USA

In the USA, most students obtain funding through their universities, payable via an extensive system of grants and contracts to their professors, such as research or teaching assistantships. However, they still cover some costs through their own resources and loans. Scientific careers depend heavily on the grant-making of federal science agencies to principal investigators. Early career development (doctoral and postdoctoral training) occurs within individual investigator-initiated, university-based public funding, so does not follow intentional or labour-market policies. [37]

4.3 Main points for further analysis and suggested input for WP2, 3 and 4

The review identified several themes that should be pursued in further detail in WP2, 3 and 4:

- **Industry involvement.** Several research papers suggest that scientists trained in France at least in part with industry funding are more likely to obtain permanent employment, while having a university grant

[33] Channah Herschberg, Yvonne Benschop, Marieke van den Brink, Precarious postdocs: A comparative study on recruitment and selection of early-career researchers, Scandinavian Journal of Management, Volume 34, Issue 4, 2018, Pages 303-310, ISSN 0956-5221, https://doi.org/10.1016/j.scaman.2018.10.001.(https://www.sciencedirect.com/science/article/pii/S095652211830040X)
[34] Haglund, A. (2018). Tidsbegränsade Anställningar Bland Högskolans Forskande Och Undervisande Personal Rapport 2018. Stockholm, Sweden: Universitetskanslerämbetet, 11
[35] Berggren Å, Almlöv C, D'Urso A and Grubbström A (2022) "Screwed from the start": How women perceive opportunities and barriers for building a successful research career. Front. Educ. 7:809661. doi: 10.3389/feduc.2022.809661
[36] Monica Gaughan, Stephane Robin, National science training policy and early scientific careers in France and the United States, Research Policy, Volume 33, Issue 4, 2004, Pages 569-581, ISSN 0048-7333, https://doi.org/10.1016/j.respol.2004.01.005.
[37] Monica Gaughan, Stephane Robin, National science training policy and early scientific careers in France and the United States, Research Policy, Volume 33, Issue 4, 2004, Pages 569-581, ISSN 0048-7333, https://doi.org/10.1016/j.respol.2004.01.005.

increases the chance of temporary employment[38] Gaughan and Bozeman (2000)´s study of established scientists in northern American universities indicates that industry involvement improves academic ability to write grants and ultimately be successful in achieving funding.[39] The SECURE project should consider the role of industry and its relationship with tenure track and seek examples of practice.

- **Mobility**. Part of the tenure track-like model in Switzerland (Eccellenza Professorial Fellowship) also includes mobility as an assessment criterion. If the applicant did not conduct a research stay of 24 months after the doctorate at one or more institutions, they must achieve equivalent mobility in qualitative terms under the Eccellenza Professorial Fellowship. It may be achieved as a stay at a non-commercial research institution (host institution) or institution in the practical realm (industry, administration, intersectoral mobility). The tension between mobility and tenure track is clear and best and good practice examples of how to mitigate this should be sought.

- **Evaluation** There appears to be limited evaluation of these funding schemes and it would be useful to know if any work has been done to evaluate specific models in detail. It is also helpful to compare scale and scope. Labour Market Information would also be useful to interrogate further. We should also consider the difference between core/funding and funding that is project or challenge led, looking in more detail at the various aspects and avoiding the view that core funding leads to a permanent contract with project funding leading to a temporary contract. For example if a tenure researcher has their salary funded by projects, it therefore frees up institutional funding for other positions eg. PhDs or Postdocs.

- **Gender.** There is some emerging evidence of gender bias in research funding with men tending to receive a greater proportion of grants and considerably higher funding on average than women. Literature was identified that sought to explain this. Finnborg[40] argued that it may be due to women tending to occupy fewer senior positions than men, whilst Berggren[41] considered female access to supervisor networks and the impact that had on career advancement. This requires further consideration and interrogation when looking at principles and practice in tenure track models and the impact of gender.

5 Recruitment and employment conditions for tenure track-like models

5.1 Methodology

This review was focused on obtaining data on recruitment and employment conditions, and what barriers and gaps have been identified. We conducted desk research on relevant literature, using keyword searches of 'recruitment conditions' and 'employment conditions', supplementing this with core documents identified by SECURE. This process was guided by the overarching research question: What are the recruitment and employment conditions in TTL models and what are the similarities and differences across Europe?

Using methodology outlined in Chapter 2, the review team examining recruitment and employment conditions for tenure track-life models received an initial list of 130 documents. We trimmed this by analysing abstracts and

[38] Mangematin, V., 2000. Ph.D. job market: professional trajectories and incentives during the Ph.D. Research Policy 29 (6), 741–756
[39] Gaughan, M., Bozeman, B., 2002. Impacts of research grants and institutional change on scientists' careers: comparing Center funding with "small science" grants. Research Evaluation
[40] Finnborg S. Steinþórsdóttir, Þorgerður Einarsdóttir, Gyða M. Pétursdóttir & Susan Himmelweit (2020) Gendered inequalities in competitive grant funding: an overlooked dimension of gendered power relations in academia, Higher Education Research & Development, 39:2, 362-375, DOI: 10.1080/07294360.2019.1666257
[41] Berggren Å, Almlöv C, D'Urso A and Grubbström A (2022) "Screwed from the start": How women perceive opportunities and barriers for building a successful research career. Front. Educ. 7:809661. doi: 10.3389/feduc.2022.809661

selecting those with most relevance. This resulted in a final list of 16 documents, which we reviewed in detail. This was supplemented by additional documents from the SECURE consortium. As a core document we examined *The Work Situation of the Academic Profession in Europe: Findings of a Survey in Twelve Countries* (Teichler and Höhle, 2013).

5.2 Main findings on recruitment and employment conditions for researchers

Since the early 1990s, there have been several national level reforms across Europe that have facilitated changes in the legal basis of organisational human resources management and modifications to higher education systems that have affected employment conditions and remuneration systems. As a result of these reforms, most universities have increased the number of staff on temporary contracts at a rate disproportionate to the creation of new permanent positions. This has resulted in a decrease in the attractiveness of academic employment more generally. The greatest challenges identified are a non-correlated long training period and uncertain career paths combined with low income.[42]

Different countries have approached the issue in diverse ways. Finland has developed harmonised research-oriented academic careers at graduate schools, but debate remains over whether these schools represent an efficient way to involve academics outside home institutions[43]. One of the main issues relates to the fact that it is necessary to facilitate research-oriented doctorates.[44] [45]

One general academic pathway that is common in all academic systems across Europe is that it starts with a doctorate followed by an extended period of postdoctoral training. For example, in the UK, postdoctoral research fellowships are a common post-PhD step for researchers. In Austria and Germany, meanwhile, long training periods can be reduced by the *Habilitation* process, which acts as an entry qualification to the professoriate[46]. Recent developments in Austria enable doctoral degree holders to become full professors, even though *Habilitation* remains the most common 'qualification step' for career advancement. This compared to an average of 5 years in Austria, Poland, Germany and Portugal.[47]

Across the EU, the period between graduation and full-time employment in academia is on average 7-8 years, with the longest periods recorded in Ireland (11 years), Croatia, Finland (13 years), and Switzerland (15 years). On average, university professors are 32 years old at the point of their first full-time appointment academia, with individual country averages of Ireland (40 years), Croatia (36 years), Portugal (27 years), Poland (25 years), and

[43] Aarrevaara, T., & Hölttä, S. (2007). Finland – Massi fi cation, steering-by-results and new divisions of labour. In W. Locke & U. Teichler (Eds.), *The changing conditions for academic work and careers in select countries* (Werkstattberichte, 66, pp. 195–209). Kassel: University of Kassel, INCHER.

[44] Laudel, G., & Gläser, J. (2008). From apprentice to colleague: The metamorphosis of early career researchers. *Higher Education, 55* (3), 387–406.

[45] Kim, M. M., & Cummings, W. K. (2011). Faculty time allocation for teaching and research in Korea and the United States: A comparative perspective. *Korean Social Science Journal, 38* (1), 1–40.

[46] Teichler, U. (2008). Academic staff in Germany: Per aspera ad astra? In Research Institute for Higher Education Hiroshima University (RIHE) (Ed.), *The changing academic profession in international comparative and quantitative perspectives* (RIHE International Seminar Reports, Vol. 12, pp. 131–152). Hiroshima: Hiroshima University.

[47] U. Teichler and E.A. Höhle (eds.), *The Work Situation of the Academic Profession in Europe: Findings of a Survey in Twelve Countries*, The Changing Academy –The Changing Academic Profession in International Comparative Perspective 8, DOI 10.1007/978-94-007-5977-0_1, © Springer Science+Business Media Dordrecht 2013

Austria (24 years). The medium age of full-time employment for senior academics is similar: Ireland (41 years) and the Netherlands (39 years).[48]

Regarding working conditions, there are differences between senior and junior academics across different countries. These are influenced by the ratio of senior and junior positions available in institutions as they limit the number of people who can be promoted to senior positions. A survey by EUROAC - The Academic Profession in Europe: Responses to Societal Challenges Project,[49] indicated that 20% or less academics are professors in Finland, Germany, Portugal, and Switzerland. The figure is around 30% in Austria, Croatia and the United Kingdom, 50% in Poland and the Netherlands, and 62% in Italy. Across the universities, most academics in junior positions are 35 years old on average but the variation is between 36-45 years and in most EU countries, around 80% of researchers are at junior stage. Austria, Ireland, Italy, the Netherlands, and Norway junior researchers comprise 60% of researchers, with junior researchers being on average 45 years or over. Generally, senior researchers are a minority in academia. The exception is Germany, where there is a ratio of 70% senior to 30% junior staff.

In the Belgian university system, postdoctoral positions are conceived as bursaries or scholarships and therefore lack social security and pension scheme contributions. In Belgian and Dutch universities, the recruitment and selection processes for state funded postdocs are not formalised. In Belgium, external research funding finances postdoc positions and it is the grant holder(s) who make(s) the selection decision.[50]

5.3 Main points for further analysis and suggested input for WP2, 3, and 4

It is important to consider the population of institution staff across the EU in the later work packages. In particular, the ratio of junior to senior researchers, with approximately 80% being junior with the remaining 20% classed as senior. This ratio varies, however, as seen in Germany, where there is a high percentage of senior positions among tenured positions, compared to the relatively low share of Senior positions overall. The examples of best and good practice that we identify, as well as the Research Career Framework, should reflect this variety.

WP leaders will also need to consider the attractiveness of career paths. In some instances, tenure track or tenure track-like models are becoming less attractive career paths for researchers simply due to their low availability and therefore likeliness of success in achieving a tenure rather than their structural characteristics. Low salaries also affect the attractiveness of these kinds of career paths and will need to be considered in the context of institutional and national funding mechanisms.

The status of employment of a researcher must also be considered and addressed particularly in instances when an individual is not able to access social security or pension schemes, as this should surely be a principle for all good employers. The project should consider further information around mobility patterns and career paths of researchers for example the More4 Higher Education Survey and final report.[51]

6 Review of career development and assessment for tenure track-like models

6.1 Methodology

[48] *The Work Situation of the Academic Profession in Europe: Findings of a Survey in Twelve Countries*, The Changing Academy –The Changing Academic Profession in International Comparative Perspective 8
DOI 10.1007/978-94-007-5977-0_1
[49] https://www.uni-kassel.de/forschung/incher/international-center-for-higher-education-research
[50] Channah Herschberg, Yvonne Benschop, Marieke van den Brink, Precarious postdocs: A comparative study on recruitment and selection of early-career researchers, Scandinavian Journal of Management, Volume 34, Issue 4, 2018, Pages 303-310, ISSN 0956-5221, https://doi.org/10.1016/j.scaman.2018.10.001.(https://www.sciencedirect.com/science/article/pii/S095652211830040X)
[51] https://ideas.repec.org/b/wfo/wstudy/67166.html

The methodology involved three main steps. First, the initial selection from the Scopus search, which returned 553 hits, was reduced to 26 academic articles via further keyword searches. After further examination of the 26 selected academic articles, 19 were considered relevant enough to be fully reviewed, in light of the scope of the enquiry. Secondly, because the academic papers selected failed to cover all the issues linked to assessment and career development for tenure track-like models, the authors consulted policy papers (the so-called core documents). In total, 23 academic and non-academic sources were analysed in depth. As a last step, findings were cross-checked with official online sources to make sure that the information provided by the papers was up to date. As such, both primary and secondary sources were included in the analysis.

6.2 Main findings on career development and assessment for tenure track-like models

This chapter explore the parameters by which an early career researcher (ECR) hired on a tenure track-like model secures a permanent position in academia, looking both at the criteria and processes used to confirm (or not) ECRs into permanent positions and at the career development initiatives put forward to support them.

We found a relatively small number of relevant papers suggesting that more research is needed on the topic, especially regarding career development. In some cases, it is possible to use more general sources on career development in academia as these are also relevant for tenure track-like models. For instance, certain career development initiatives such as formal mentoring schemes and trainings are considered as a useful for academic careers in general.[52] Papers focusing on the gendered dimensions[53] of assessment and career development also show that initiatives looking to fostering inclusiveness may fail to address intersectional challenges.[54] It is expected that these and other issues of a wider general interest to research careers are covered in other chapters.

It is important to note that context (e.g. legislative, cultural, institutional, disciplinary) varies and determines to a large extent the issues raised regarding assessment and career development for tenure track-like models. Yet 'little work has been done on the crossover generalisability of academic career development practices across fields.[55] Indeed, 'career development interventions that are designed for the arts and humanities may not readily generalize to fields of basic science or medicine.'[56]

Different academic cultures and funding models provide for different systems governing academic careers.[57] In some cases, the introduction of tenure track-like models has been considered as a way of addressing some of the

[52] Zacher, H., Rudolph, C. W., Todorovic, T., & Ammann, D. (2019). Academic career development: A review and research agenda. *Journal of Vocational Behavior*, *110*, 357-373. See also: Petter, S., Richardson, S., & Randolph, A. B. (2018). Stuck in the middle: Reflections from the AMCIS mid-career workshop. Communications of the Association for Information Systems, 42(1), 3 and Rossouw, J. (2022). Sustainable development of a researcher's career trajectory. *Perspectives in Education,* 40(3), 78-94.

[53] See, for example, Barnard, S., Rose, A., Dainty, A., & Hassan, T. (2021). Understanding social constructions of becoming an academic through women's collective career narratives. *Journal of Further and Higher Education*, 45(10), 1342-1355.

[54] Zacher, H., Rudolph, C. W., Todorovic, T., & Ammann, D. (2019). Academic career development: A review and research agenda. *Journal of Vocational Behavior*, *110*, 357-373.

[55] Zacher, H., Rudolph, C. W., Todorovic, T., & Ammann, D. (2019). Academic career development: A review and research agenda. *Journal of Vocational Behavior*, *110*, 357-373.

[56] Zacher, H., Rudolph, C. W., Todorovic, T., & Ammann, D. (2019). Academic career development: A review and research agenda. *Journal of Vocational Behavior*, *110*, 357-373.

[57] Michael M Kochen & Wolfgang Himmel (2000). Academic careers in general practice: scientific requirements in Europe, *European Journal of General Practice*, 6:2, 62-65. See also: European Commission (2018). Survey on researchers in European Higher Education institutions. Annex to MORE3 study: support data collection and analysis concerning mobility patterns and career paths of researchers. Link available here https://www.euraxess.lt/sites/default/files/policy_library/survey_on_researchers_in_european_higher_education_institutions.pdf

pitfalls of the existing systems. This is clearest in Germany, where a *habilitation* system provides a formalised gatekeeping process to professorships. [58] Over time, alternative routes to permanent academic positions have been developed alongside the *habilitation* system in Germany, including tenure track.[59] With that option 'the quality of the tenure-track professor's performance is the only aspect considered when deciding whether to make the position permanent',[60] and the criteria for assessment must be 'well defined and transparent' at the time of appointment[61]. During the process, candidates can schedule an interim evaluation for guidance on their career path.[62].

The assessment criteria laid out at the time of appointment is a key aspect of tenure track-like models. Although assessment or performance criteria may include grant acquisition, educational activities, service activities (e.g. committee participation, community service, journal and grant reviewing),[63] mobility, and language requirements, the focus on publications is shared across many countries[64]The relationship between these and funding may well be worthy of more consideration.. A study on tenure track assessment in Finland shows that 'performance criteria in tenure track positions primarily represent[ed] management's ideas of the expected contributions during the career path', emphasising "peer-reviewed publications in high-quality arenas and academically oriented research funding", and rendering professionals dependent on performance management.[65] By contrast, at the University of Antwerp in Flanders, Belgium, competencies and leadership potential are also assessed.[66] This is relevant in light of the roles and tasks the researcher will have to perform when tenured (for instance, as principal investigator). The University of Bremen in Germany has similarly adopted a policy that avoids focusing only on quantitative indicators, and also includes the consideration of 'potential' in relation to performance criteria[67]. The setting up of an Interdisciplinary Committee has supported more qualitative evaluation and encourages evaluators to develop 'more sensibility to the different cultures that are characteristic

[58] Huisman, J., De Weert, E., & Bartelse, J. (2002). Academic careers from a European perspective: The declining desirability of the faculty position. *The journal of higher education*, *73*(1), 141-160.

[59] Federal Ministry of Education and Research (Germany) (2023). The way to a professorship. Available at https://www.research-in-germany.org/en/your-goal/postdoc/career-options-and-dual-careers/professorship.html (last visited on 18 April 2023)

[60] Federal Ministry of Education and Research (Germany) (2023). The Tenure-Track Professorship. Available at https://www.tenuretrack.de/en/the-tenure-track-programme/the-tenure-track-professorship (last visited on 18 April 2023).

[61] Federal Ministry of Education and Research (Germany) (2023). The Tenure-Track Professorship. Available at https://www.tenuretrack.de/en/the-tenure-track-programme/the-tenure-track-professorship (last visited on 18 April 2023).

[62] Federal Ministry of Education and Research (Germany) (2023). The Tenure-Track Professorship. Available at https://www.tenuretrack.de/en/the-tenure-track-programme/the-tenure-track-professorship (last visited on 18 April 2023)

[63] Hamilton, J. G., Birmingham, W. C., Tehranifar, P., Irwin, M. L., Klein, W. M., Nebeling, L., & Chubak, J. (2013). Transitioning to independence and maintaining research careers in a new funding climate: american society of preventive oncology junior members interest group report.

[64] OECD. (2021). Reducing the precarity of academic research careers. *OECD Science, Technology and Industry Policy Papers*, (113).

[65] Pietilä, M., & Pinheiro, R. (2021). Reaching for different ends through tenure track—institutional logics in university career systems. *Higher Education*, *81*, 1197-1213. See also Pietilä, M. (2015). Tenure track career system as a strategic instrument for academic leaders. *European Journal of Higher Education*, *5*(4), 371-387.

[66] Flemish government (2023). Decree of the Flemish Government to codify the decree provisions concerning higher education (translated by the authors). Available at https://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=14650 (last visited on 18 April 2023). See also Rahal, RM., Fiedler, S., Adetula, A. et al. (Comment) Quality research needs good working conditions. *Nature Human Behaviour* 7, 164–167 (2023) for the inclusion of Open Science practices as part of the assessment criteria for a permanent position.

[67] YERUN (2022) Rethinking academic careers. https://yerun.eu/wp-content/uploads/2022/06/YERUN-RethinkingAcademicVFinalSpreads.pdf (last visited on 18 April 2023). See also Barnes, N., du Plessis, M., & Frantz, J. (2021). Perceived career management challenges of academics at a South African university. *Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 19(0), a1515, for accounts of researcher's perceived disparity between their career trajectory and performance expectations when related to individual competences and strengths.

of each discipline'.[68] Beyond individual performance, it should be noted that mobility to another institution or sector can be an advantage in some systems, while in others, as sense of 'loyalty' to the home institution may mean that limiting extending periods away may be a more successful strategy.[69]

In some cases, external criteria – i.e., criteria not linked to the academic performance of the researcher – are used. In Flanders, for example, a B2 level in Dutch needs to be attained within a fixed time period as a condition to being offered a professorship.[70] Other external criteria include the availability of sufficient funding for a permanent position at the time in which the tenure track position expires. In this regard, an important recommendation found in the reviewed literature is to only offer tenure track positions after careful financial projections and only when there is a clear funding envisaged at the end of the assessment period.[71], however this is unlikely to be realistic so perhaps it is important instead to consider where the future funding will be sourced from.

The reviewed literature shows that national governments can influence the choices made by universities in relation to assessment or career development for tenure track-like models via budgetary means rather than direct legislation. For instance, 'Finnish legislation includes few provisions for promotion and tenure processes. However, the state may have an indirect influence through the performance indicators in the universities' budget funding models'. [72] Thus, indicators set by the national authority may drive policy in universities so they can maximize budgets. National employment laws could also impede the termination of an academic's contract if they failed to meet the criteria for tenure.[73] In that vein, it has been noted that although institutions are often autonomous actors with respect to human resource management practices, the legal framework and the funding schemes in which they operate are a decisive factor.[74] In Germany, universities are required to provide career development strategies for all academic personnel (including those enrolled on tenure tracks models and those on other paths) in order to be eligible to apply for financial support under the tenure track programme.[75]

Another relevant factor is the institutional make-up at national level regarding the career progression of researchers in the run up to a permanent position. Central bodies can play a key role in the assessment of quality of research and have an important effect on careers: for instance, HéCERES in France (Haut Conseil de l'évaluation de la recherche et de l'enseignement supérieur) or ANECA in Spain (Agencia Nacional de Evaluación

[68] YERUN (2022) Rethinking academic careers. https://yerun.eu/wp-content/uploads/2022/06/YERUN-RethinkingAcademicVFinalSpreads.pdf (last visited on 18 April 2023).

[69] See Sanz-Menéndez, L., Cruz-Castro, L., & Alva, K. (2013). Time to tenure in Spanish universities: An event history analysis. *PloS one*, *8*(10), e77028. See more generally Seeber, M., Debacker, N., Meoli, M., & Vandevelde, K. (2022). Exploring the effects of mobility and foreign nationality on internal career progression in universities. *Higher Education*, 1-41.

[70] Flemish government (2023). Decree of the Flemish Government to codify the decree provisions concerning higher education (translated by the authors). Available at https://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=14650 (last visited on 18 April 2023).

[71] Boulton, G. (2011). Harvesting talent: Strengthening research careers in Europe. *Procedia-Social and Behavioral Sciences*, *13*, 3-34.

[72] Pietilä, M., & Pinheiro, R. (2021). Reaching for different ends through tenure track—institutional logics in university career systems. *Higher Education*, *81*, 1197-1213. See also Saenen, B., Hatch, A., Curry, S., Proudman, V., & Lakoduk, A. (2021). Reimagining Academic Career Assessment: Stories of Innovation and Change. Case Study Report. *European University Association*: "the evaluation of research "quality" in Finland has been based on a publication classification system initiated by the Ministry of Education and Culture that links funding to publication venues."

[73] Pietilä, M., & Pinheiro, R. (2021). Reaching for different ends through tenure track—institutional logics in university career systems. *Higher Education*, *81*, 1197-1213.

[74] OECD. (2021). Reducing the precarity of academic research careers. *OECD Science, Technology and Industry Policy Papers*, (113).

[75] OECD. (2021). Reducing the precarity of academic research careers. *OECD Science, Technology and Industry Policy Papers*, (113).

de la Calidad y Acreditación).[76] Other, new types of bodies have been set up at an institutional level. In certain Finnish universities, where tenure decisions are centralised at rector level, 'faculty-and university-level *tenure track committees* (…) control the fairness and transparency of the selection and evaluation processes, but they have also intervened in cases where the proposed candidate has not fulfilled the university's recruitment criteria'.[77]

Specific research or disciplinary approaches can result in additional challenges for tenure assessment. For instance, participating in team science as assessment criteria are usually designed for the evaluation of individual work.[78] Evaluation of participation in team science often comes with the risk of rewarding principal investigators rather than appropriately recognising the input of the different team members. It has been suggested in such cases that roles should be clearly identified so that the input of each participant can be properly assessed, as far as possible.[79] Secondly, in team science, projects may take longer to be completed because of the time it takes to organise the team, learn to work together effectively, or design new methodologies linked in some cases to the interdisciplinary nature of the team's work. Such features of team science need to be integrated into the way contributions are assessed, otherwise researchers in tenure track-like models will be disincentivised from participating in team science. In other words, it is better to reward 'multifaceted research contributions 'in assessments,[80] and assessments for tenure should pay due regard to differences between academic fields.[81]

Another key consideration is maternity or paternity leave or family care more broadly, which disproportionately affects women's careers. A study completed in the UK shows that in certain systems, arrangements for the adjustment of work after maternity/parental leave remain largely informal, with the adjustment of expectations in terms of research or teaching output often depending on ad hoc, individual negotiations.[82] For instance, some female researchers have been found to feel an expectation to use maternity leave to continue producing research outputs, which in turn allow them to secure tenure. With the rising importance of parental leave, similar issues may be raised for the other parent, as well as any researcher with caring responsibilities.[83] This was taken into consideration in the UK when the Office of Intramural Research (OIR) implemented an "Extend the Clock" provision, allowing for a delay in the tenure decision for National Institutes of Health (NIH) tenure-track researchers due to time allocated for family care.[84]

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[76] Marini, G. (2021). Coercive and mimetic isomorphism as outcomes of authority reconfigurations in French and Spanish academic career systems. *Policy Reviews in Higher Education*, *5*(1), 89-108.

[77] Pietilä, M. (2015). Tenure track career system as a strategic instrument for academic leaders. *European Journal of Higher Education*, *5*(4), 371-387.

[78] Zucker D. (2012). Developing Your Career in an Age of Team Science. *Journal of Investigative Medicine,* 60(5):779-784.
[79] Zucker D. (2012). Developing Your Career in an Age of Team Science. *Journal of Investigative Medicine*, 60(5):779-784.

[80] Rahal, R. M., Fiedler, S., Adetula, A., Berntsson, R. P. A., Dirnagl, U., Feld, G. B., … & Azevedo, F. (2023). Quality research needs good working conditions. *Nature Human Behaviour*, 1-4.

[81] On this, see also Khan, T. A., Jabeen, N., & Christensen, T. (2022). Rewarding academics: Experiences of the Tenure Track System in Pakistan. *Higher Education Quarterly*.

[82] Akram, S., & Pflaeger Young, Z. (2021). Early career researchers' experiences of post-maternity and parental leave provision in UK politics and international studies departments: a heads of department and early career researcher survey. *Political Studies Review*, *19*(1), 58-74.

[83] Akram, S., & Pflaeger Young, Z. (2021). Early career researchers' experiences of post-maternity and parental leave provision in UK politics and international studies departments: a heads of department and early career researcher survey. *Political Studies Review*, *19*(1), 58-74.

[84] Plank-Bazinet, J. L., Whittington, K. B., Cassidy, S. K., Filart, R., Cornelison, T. L., Begg, L., & Clayton, J. A. (2016). Programmatic efforts at the National Institutes of Health to promote and support the careers of women in biomedical science. *Academic Medicine*, *91*(8), 1057.

6.3 Main points for further analysis and suggested input for WP2, 3 and 4

The Researcher Career Framework (*WP2 - Development of the Research Career Framework*) will consider the challenges to academic development and strive for inclusiveness. In this respect, an intersectional perspective should be kept in mind when designing the framework. The framework should look at the potential of academics and not just published articles. Furthermore, the recommendations laid out in the previous section on team science (even more so in the current context of project-based funding) and family care (initiatives such as the one mentioned in the UK could serve as inspiration) have potential to diversify and boost academic careers.

The tenure track-like models (*WP3 - Development of Tenure Track-Like Models*) could benefit from an analysis of a selection of countries showing good practices (the literature in the present chapter includes examples from Germany, Belgium, Finland and the UK -further research could also include examples in The Netherlands). This may be considered for the interview phase as it would allow us to delve deeper into the particularities of their models, mentoring and training schemes, while shedding more light on the link between academic development and the tenure track.
In WP2, different models may be designed that consider the potential of the candidate, contributing to more all-encompassing approaches to assessment. Moreover, the funding landscape and legal frameworks governing research careers play a key role in determining the amount of funding available for permanent positions, so they must not be disregarded when developing the tenure track-like models. Availability of sufficient funding should be considered when advertising a permanent position with clear indication as to whether an individual is required to bring in third party funding at a later stage. It is limiting for all permanent positions to be covered by core funding. Many options exist for this and there can be strong expectations of tenured researchers to bring in grant money. It will be useful to highlight different models and expectations and consider best and good practice in how individuals are supported to do this.
The recommendation on parental leave and caregiving should also be considered when designing the suite of options for the models. We anticipate that these considerations will also be important during the implementation period of the project (*WP4 - Implementation of the Research Career Framework*).

7 Conclusions and Input to WP2 (Research Career Framework), WP3 (Tenure Track-Like Models) and WP4 (Implementation of the Career Framework)

This state of the art has highlighted the huge variance internationally around understandings of tenure track-like models and what is feasible, desirable and culturally acceptable at institutional and national levels given variations in funding and legislation. In the development of tenure track-like models, WP3 must look to reflect this by offering a range of options institutions might consider and demonstrating how they can operate on practical and administrative basis. This must be truly inclusive and fully consider the national contexts in which researchers operate as well as all other equality, diversity and inclusion implications. Good and best practice identified should be mapped by country to highlight where examples are numerous and where gaps are identifiable. In order to start to access and compare systems it may be a useful tool to compare the various models with graphics that demonstrate the transition phases, highlighting difference, for example who can apply, time to tenure, assessment, position in case of positive evaluation etc.

The tenure track-like models should highlight best practice but avoid any suggestion that one system is superior or that there is only one way of implementing a programme. Examples collected should be clear and practical and operate as a helpful tool for any institution or individual with an interest in this topic.

The work package should seek to find a clear SECURE project definition on tenure track and a set of principles as to what might be important when establishing a good tenure track model. For example, a fair and competitive

selection process, appropriate salary level and a transparent evaluation system. This will complement the best and good practice examples.

Limited information has been found from the perspective of research funding organisations and it is important to include examples of practice from this perspective. This will need to acknowledge the national funding contexts and the difference in funding models and finance available. Equally, it is important to consider the role of industry and how this relates to tenure track. Funding of tenure track-like models is also of real interest particularly the balance between core and project funding and examples of how both and blended options work in practice. Core funding whilst sometimes desirable if limited and therefore examples of how this may work for specific projects are of interest.

Whilst universities are autonomous in terms of their Human Resource and Management practices they are restricted by the legal framework of the country. However, we should seek to establish clear guidelines with full social security benefits being a clear component of our models.

It is important to acknowledge some of the more challenging aspects of the tenure track system and consider how these may be mitigated; for example, in limiting mobility or recruiting a particular type of researcher.

The development of the Research Career Framework in WP2 should incorporate tenure track-like models and reflect their place in a research career framework. Language and messages particularly around researcher support and the principles of tenure track should be complementary and the two parallel work packages should be developed in partnership to address precarity and create outputs that are of most benefit to the partner organisations.

Given the limited time for the WP4 trial phase, particularly in comparison to the time it usually takes to achieve tenure, effort should be made to develop small practical options so that meaningful initiatives are tested. These should be developed in collaboration with the consortium partners responsible for the trial. There is a need to fully understand what is possible at the trial institutions and offer as much support as possible to ensure the trial has the most likelihood of success.

Creating a comprehensive suite of tenure track-like models alongside a set of essential principles for tenure track will provide a practical tool for European institutions when considering tenure track as a way of retaining talent and reducing precarity for researchers.

8 Annexes and bibliography

Annex 1 – Overall Literature for Tenure Track-Like Models

Name	Year	Author	Link
The Tenure-Track Programme	2016	Federal Ministry of Education and Research (Germany)	https://www.tenuretrack.de/en/the-tenure-track-programme
The rocky road to tenure – career paths in academia	2015	Brechelmacher A., Park E., Ates G., Campbell D.F.J.	https://www.scopus.com/inward/record.uri?eid=2-s2.0-84940720337&doi=10.1007%2f978-3-319-10720-2_2&partnerID=40&md5=6ed08959c84ed9919144b25e972be2e1

Tenure and tenure track at LERU universities: Models for attractive research careers in Europe	2014	League of European Research Universities (LERU)	https://www.leru.org/files/Tenure-and-Tenure-Track-at-LERU-Universities-Full-paper.pdf
Reaching for different ends through tenure track—institutional logics in university career systems	2021	Pietilä, M., Pinheiro, R.	https://link.springer.com/article/10.1007/s10734-020-00606-2#citeas
Incentivising Academics: experiences and expectations of the tenure track in Finland	2019	Pietilä, M.	https://helda.helsinki.fi/bitstream/handle/10138/303215/Pietil_SHE_2017.pdf?sequence=1
The Tenure Track Model: Its Acceptance and Perceived Gendered Character	2022	O'Connor P. and Drew, E.	https://www.mdpi.com/2813-4346/2/1/5/html
Translating tenure track into Swedish: tensions when implementing an academic career system	2017	Henningsson, M. Jörnesten, A., Geschwind, L	http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1070112&dswid=3374
Can mentoring help female assistant professors in economics? An evaluation by randomized trial	2020	Ginther, D., Currie, J., Blau, F., Croson, R.,	https://www.nber.org/system/files/working_papers/w26864/w26864.pdf
Peer mentoring for tenure-track faculty	2003	Jacelon, C. Zucker, D., Staccarini, J-M, Henneman, E.	https://www.jou.ufl.edu/wp-content/uploads/2016/02/Jacelon-et-al.pdf#:~:text=Four%20tenure-track%20nursing%20faculty%20members%20at%20a%20large%2Cresearch-intensive,2003.%20%C2%A9%202003%20Elsevier%20Inc.%20All%20rights%20reserved.
Academic career structures in Europe : Perspectives from Norway, Denmark, Sweden, Finland, the Netherlands, Austria and the UK	2018	Frølich, N, Wendt, K. Reymert, I, Tellmann, S., Elken, M., Kyvik, S., Vabø, A., Larsen, E.	https://nifu.brage.unit.no/nifu-xmlui/bitstream/handle/11250/2487666/NIFUreport2018-4.pdf?sequence=1&isAllowed=y
The Recruitment of Full Professors According to Pre-determinded Criteria in Four Countries	2022	Mäntysaari, P.	https://journals.ub.umu.se/index.php/njolas/article/view/242/230
2021 National Report on Junior Scholars	2021	Consortium for the National Report on Junior Scholars, Germany	https://buwin.de/dateien/2021/buwin-2021-keyresults.pdf

Structural properties and epistemic effects of scientific careers in transition to tenured professorships	2022	Philippe Dittmann	https://doi.org/10.5281/zenodo.6975389
Report of the first Leibniz PostDoc Survey 2020	2020	Daniela Fiedler, Thomas Lösch, Gitta Heinz, Tamara Heck, Verónica Díez Díaz, Lydia Repke, Harry Williams, Johannes Breuer, Gunudla Zoch	https://nbn-resolving.org/urn:nbn:de:0168-ssoar-83394-4
HU Berlin plant Dauerstellen für Postdocs ab 2023	2022	Lea Goldan, Steffen Jaksztat, Christiane Gross	https://doi.org/10.1007/s10734-022-00908-7
Tracking the Tenure Track	2023	Die Junge Akademie, Germany	https://www.diejungeakademie.de/en/press/dem-tenure-track-programm-auf-der-spur
What and How Long Does It Take to Get Tenure? The Case of Economics and Business Administration in Austria, Germany and Switzerland	2019	Günther G. Schulze, Christian Wiermann, Susanne Warning	https://doi.org/10.1111/j.1468-0475.2008.00449.x
Leibniz Programme for Women Professors	2022	Leibniz Assocation	https://www.leibniz-gemeinschaft.de/en/research/leibniz-competition/leibniz-programme-for-women-professors
Lise Meitner Excellence Program	2021	Max Planck Society	https://www.mpg.de/18399586/lise-meitner-gruppenleiterinnen-2021.pdf
Precarious Careers in Research. Analysis and Policy Options.	2022	Jürgen Janger, Alexandros Charos, Peter Reschenhofer, Anna Strauss-Kollin, Fabian Unterlass, Stefan Weingärtner	https://ideas.repec.org/b/wfo/wstudy/70473.html
University of Antwerp - HR Excellence in Research	N/A	University of Antwerp	https://www.uantwerpen.be/en/jobs/uantwerp-as-an-employer/hr-excellence-in-research/
Tenure Track Career System as a Strategic Instrument	2015	Maria Pietila	Tenure track career system as a strategic instrument for academic leaders: European Journal of Higher

			Education: Vol 5, No 4 (tandfonline.com)
Rewarding academics: Experiences of the Tenure Track System in Pakistan	2022	Tayeb Ali Khan, Nasira Jabeen, Tom Christensen	https://onlinelibrary.wiley.com/doi/full/10.1111/hequ.12410
Rethinking Academic Careers	2022	YERUN	https://yerun.eu/wp-content/uploads/2022/06/YERUN-RethinkingAcademicVFinalSpreads.pdf
Time to Tenure in Spanish Universities: An Event History Analysis	2013	L Sanz-Menendez, Laura Cruz-Castro, Kennedy Alva	https://www.eui.eu/programmesandfellowships/academiccareersobservatory/academiccareersbycountry/austria
Do researchers' careers have to be precarious?	2019	Robin Mellors-Bourne	Research article: Do researchers' careers have to be precarious? — Vitae Website

Annex 2 – Review of Funding Schemes for Tenure Track-Like Models

Name	Date	Author
"Screwed from the start": How women perceive opportunities and barriers for building a successful research career. Front. Educ. 7:809661. doi: 10.3389/feduc.2022.809661	**2022**	Berggren Å, Almlöv C, D'Urso A and Grubbström A
Precarious postdocs: A comparative study on recruitment and selection of early-career researchers, Scandinavian Journal of Management, Volume 34, Issue 4, Pages 303-310, ISSN 0956-5221, https://doi.org/10.1016/j.scaman.2018.10.001.(https://www.sciencedirect.com/science/article/pii/S095652211830040X)	**2018**	Channah Herschberg, Yvonne Benschop, Marieke van den Brink,
Bekanntmachung der Verwaltungsvereinbarung zwischen Bund und Ländern gemäß Artikel 91b Absatz 1 des Grundgesetzes über ein Programm zur Förderung des wissenschaftlichen Nachwuchses, Gemeinsame Wissenschaftskonferenz Buro https://www.tenuretrack.de/de/dateien/tenure-track/verwaltungsvereinbarung-wissenschaftlicher-nachwuchs-2016.pdf	**2016**	Dirk-Olivier Laurent
Gendered inequalities in competitive grant funding: an overlooked dimension of gendered power relations in academia, Higher Education Research & Development, 39:2, 362-375 DOI: 10.1080/07294360.2019.1666257	**2020**	Finnborg S. Steinþórsdóttir, Þorgerður Einarsdóttir, Gyða M. Pétursdóttir & Susan Himmelweit

Impacts of research grants and institutional change on scientists' careers: comparing Center funding with "small science" grants. Research Evaluation	**2002**	Gaughan, M., Bozeman, B
Tidsbegränsade Anställningar Bland Högskolans Forskande Och Undervisande Personal Rapport	**2018**	Haglund A
Performance-based Institutional Research Funding in Flanders, Belgium. Scholarly Assessment Reports, 3(1), p.3 https://doi.org/10.29024/sar.29	**2021**	Luwel M
Ph.D. job market: professional trajectories and incentives during the Ph.D. Research Policy 29 (6), 741–756	**2000**	Mangematin, V
National science training policy and early scientific careers in France and the United States, Research Policy, Volume 33, Issue 4, Pages 569-581	**2004**	Monica Gaughan, Stephane Robin
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Performance-based research funding in EU Member States—a comparative assessment, Science and Public Policy, Volume 46, Issue 1, Pages 105–115,	**2019**	Thomas Zacharewicz, Benedetto Lepori, Emanuela Reale, Koen Jonkers

Annex 3 – Review of recruitment and employment conditions for tenure track-like models

Name	Date	Author
The Work Situation of the Academic Profession in Europe: Findings of a Survey in Twelve Countries, The Changing Academy –The Changing Academic Profession in International Comparative Perspective 8 DOI 10.1007/978-94-007-5977-0_1	**2013**	U. Teichler and E.A. Höhle (eds.),
Finland – Massi fi cation, steering-by-results and new divisions of labour	**2007**	Aarrevaara, T., & Hölttä, S
The changing conditions for academic work and careers in select countries (Werkstattberichte, 66, pp. 195–209	**2007**	W. Locke & U. Teichler (Eds.),
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Annex 4 – Sources for review of career development and assessment for tenure track-like models

Name	Date	Author
Early career researchers' experiences of post-maternity and parental leave provision in UK politics and international studies departments: a heads of department and early career researcher survey. Political Studies Review, 19(1), 58-74.	2021	Akram, S., & Pflaeger Young, Z
Understanding social constructions of becoming an academic through women's collective career narratives. Journal of Further and Higher Education, 45(10), 1342-1355.	2021	Barnard, S., Rose, A., Dainty, A., & Hassan, T
Perceived career management challenges of academics at a South African university. Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur, 19(0), a1515	2021	Barnes, N., du Plessis, M., & Frantz, J
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Transitioning to independence and maintaining research careers in a new funding climate: american society of preventive oncology junior members interest group report.	2013	Hamilton, J. G., Birmingham, W. C., Tehranifar, P., Irwin, M. L., Klein, W. M., Nebeling, L., & Chubak, J
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Stuck in the middle: Reflections from the AMCIS mid-career workshop. Communications of the Association for Information Systems, 42(1), 3	2018	Petter, S., Richardson, S., & Randolph, A. B
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YERUN (2022). Rethinking academic careers	2023	
Academic career development: A review and research agenda. Journal of Vocational Behavior, 110, 357-373.	2019	Zacher, H., Rudolph, C. W., Todorovic, T., & Ammann, D.
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